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Timed Up and Go Test (TUG) and Five Times Sit to Stand Test (FTSST) at enrollment and 1 year

GROUP	TUG baseline Mean (CI)	TUG – 1 year Mean (CI)	FTSST – baseline Mean (CI)	FTSST – 1 year Mean (CI)
1	10,6 (10,3–12,4)	10,8 (10,4–13,1)	20,6 (20,5–24,7)	16,6 (16,6–20,3)
2	10,9 (11,2–13,6)	11,5 (10,8–13,5)	23,2 (20,6–24,8)	17,4 (15,4–18,7)
3	11,8 (11,7–14,9)	12 (11,6–14,3)	21,4 (20,4–26,7)	17 (16,2–20,2)
4	12,6 (12,2–15,6)	12 (11,4–14,2)	22,1 (20,4–26,3	18,4 (17,7–23,21)
	P = 0.240		P = 0,037	
CLASSROOM (1+2+3)	12.4 (11.6–13.1)	12.3 (11.5–13.1	23 (21.5–24.4)	17.9 (16.9–18.9
NO CLASSROOM	13.9 (12.2–15.6)	12.8 (11.4–14.2	23.3 (20.4–26.3)	20.4 (17.7–23.2)
	P = 0.066		P = 0.012	

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JOINT-SPECIFIC FACTORS AND COPING STYLES ARE ASSOCIATED WITH DISABILITY IN PATIENTS WITH HAND OSTEOARTHRITIS

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Purpose: Hand osteoarthritis (OA) leads to considerable limitations in daily activities. It is unclear which factors contribute to these limitations. The objective of this study was to examine the role of joint-specific factors and coping styles on disability in patients with hand OA.
Methods: Cross-sectional data and 1 year follow-up data were used of the ongoing HOSTAS (Hand OSTeoArthritis in Secondary care) study, in which consecutive patients are included, who are diagnosed by the treating rheumatologist with primary hand OA. Participants underwent physical examination to assess the number of joints with bony joint enlargements (0–30), pain upon palpation (0–30), soft tissue swelling (0–30), deformities (0–22) and limitations in motion (0–22). Disability was assessed by the Functional Index for hand OA (FIHOA); this scale ranges from 0–30. A FIHOA score of $\geq$5 was considered as disability. Coping styles were assessed with the Coping with Rheumatic Stressors (CORS) and divided into tertiles. The lowest tertile represented the most beneficial scores and was used as reference category. Conventional radiographs were obtained of the hands and scored using the Kellgren-Lawrence (KL) grading scale. Odds Ratio (OR) with 95% confidence intervals (CI) were calculated using multivariate logistic regression as measures of relative risk for reporting disability in our cross-sectional data, adjusted for age, sex, BMI and joint-specific variables when appropriate. In addition, multivariate analyses were performed for reporting disability after 1 year, adjusting for age, sex, BMI, joint-specific variables and baseline FIHOA.
Results: 314 patients (88% women, mean age 61.4 yrs, median BMI 26.4 kg/m^2) were included with median FIHOA score of 8 (range 0–24). Longitudinal data after 1 year were available in 173 patients, with a median FIHOA score of 9 (range 0–28) after 1 year. FIHOA scores after 1 year were significantly different than cross-sectional scores. The patients with follow-up data were not different from the total group. In the cross-sectional analysis 68% of the patients were considered as disabled, whereas after 1 year the proportion of patients with disability was 71%. In cross-sectional analyses the number of joints painful upon palpation, with deformity and limitations in motion were positively associated with disability (OR 1.11 (95%CI 1.05–1.18), 1.10 (1.02–1.19), 1.08 (1.04–1.11), respectively). KL score was also associated with disability (OR 1.03 (1.00–1.05). In multivariate analysis including all joint-specific factors, only painful joints and joints with limitations in motion remained associated. Cross-sectional multivariate analyses investigating coping styles showed that the highest tertiles for the CORS coping with pain scales "comforting cognitions" (OR 2.14 (95%CI 1.08–4.22) and "decreasing activity" (OR 2.59 (95% CI 1.28–5.25)) were positively associated with disability. The highest tertile for the coping with limitations scale "pacing" was also associated with disability (OR 3.07 (95%CI 1.53–6.16). Disability after 1 year was only associated with the coping scales "decreasing activity" and "pacing" at baseline. These coping styles were associated with disability, independently of joint-specific factors. The joint-specific factors were also associated with disability, independently of coping styles.
Conclusions: In patients with hand OA, joint-specific factors and passive coping styles were both independently associated with disability. Our results suggest that interventions should aim at joint-specific complaints as well as changing coping styles to improve functional outcome.

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NEGATIVE ILLNESS PERCEPTIONS ARE ASSOCIATED WITH SHORT-TERM DISABILITY IN PATIENTS WITH HAND OSTEOARTHRITIS

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Purpose: Hand osteoarthritis (OA) results in considerable limitations of activities in daily life. Which factors contribute to disability in hand OA is unclear. Previous studies have shown that both joint-specific and psychosocial factors contribute to the outcome. From generalized OA we know that in the long-term negative illness perceptions are associated with more disability. In the present study we aim to investigate the association of illness perceptions with disability, and to determine the predictive value of illness perceptions in disability after a short-term follow-up period of one year in patients with hand OA.
Methods: Data were used of the HOSTAS (Hand OSTeoArthritis in Secondary care) study, an ongoing observational cohort. Consecutive patients with primary hand OA diagnosed by the treating rheumatologist in the outpatient clinic of the LUMC have been included. HOSTAS aims to investigate determinants of outcome in patients with hand OA. Illness perceptions were measured at baseline, using the Illness Perception Questionnaire – Revised (IPQ-R). The IPQ-R measures both cognitive and emotional representations of illness in three sections. The first section is the identity component and is concerned with symptoms that patients associate with OA. The second section consists of seven subscales representing the individual's perceptions about the impact of OA in physical, social and psychological functioning. The third section comprises of 18 possible causes that patients attribute OA to, grouped in four dimensions. At baseline and after one year follow-up disability was assessed by the Functional Index for Hand Osteo-Arthritis (FIHOA); the scale ranges from 0–30 (higher score means more disability). Physical examination of all DIP, PIP, IP, MCP and 1st CMC joints was performed by a research nurse on baseline for number of bony swellings (0–30), number of painful joints upon palpation (0–30), number of deformed joints (0–22, not MCP 2–5) and number of joints limited in range of motion (ROM)(0–22). Linear regression analysis was used to associate scores of each IPQ-R dimension to scores in disability, adjusted for age, sex, BMI, number of bony swellings, painful joints, joints with limited ROM and deformed joints. Additional adjustment was made for baseline FIHOA score in longitudinal analysis.
Results: The sample has 258 patients with a mean age of 61 years, 86.4% women, a mean BMI of 27.4 kg/m^2 and a median number of bony swellings of 11 (range 0–24), of joints painful upon palpation of 3 (0–30), of joints limited in motion of 6 (0–22) and of deformed joints of 5 (0–17). After one year, the FIHOA was completed by 198 patients. The mean FIHOA score at baseline was 8.9 (SD 5.9) and after one year 9.3 (6.3) and mean change in FIHOA was 0.81 (SD 3.7, range −10 to 12). At baseline, five dimensions of the IPQ-R were associated with disability. These five consisted of more symptoms attributed to OA on the identity section (β 0.62; 95%CI 0.33, 0.91), more perceived consequences (0.47; 0.32, 0.62), less illness coherence (−0.25; −0.42, −0.08), more negative emotions associated with OA (0.35; 0.22, 0.47) and beliefs about psychological factors as an attributed cause (0.22; 0.06, 0.38). Disability at one year follow-up was associated with other baseline IPQ-R dimensions. These were perceived illness chronicity (0.20; 0.04, 0.36), less perceived treatment control (−0.28; −0.47, −0.09) and immunity as causal factor (−0.25; −0.50, −0.01). On the other dimensions of the IPQ-R a trend was seen with more negative illness perceptions being associated with more disability, both at baseline and at follow-up.

Conclusions: These results show that illness perceptions are associated with disability cross-sectionally and also after short-term follow-up. Dimensions of illness perceptions that are of importance cross-sectionally are not the same as those that are associated with disability longitudinally. These results may imply that biopsychosocial interventions aiming at changing negative illness perceptions can contribute to better functional, psychological and social outcome. As such interventions produce positive effects on important outcome measures in patients with various chronic illnesses, psychological interventions in patients with hand OA are urgently called for.

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THE ASSOCIATION BETWEEN MUSCLE WEAKNESS AND ACTIVITY LIMITATIONS IN PATIENTS WITH EHLERS DANLOS (HYPERMOBILITY TYPE): THE IMPACT OF PROPRIOCEPTION

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Purpose: Patients diagnosed with Ehlers Danlos Syndrome Hypermobility Type (EDS-HT) are characterized by connective tissue laxity which is associated with chronic pain, fatigue, muscle weakness and potentially leading to activity limitations. When developing effective treatment for patients with EDS-HT it is essential to know which factors are associated with activity limitations. In EDS-HT, a direct relationship between muscle strength and activity limitations has never been studied in detail. The association between limitations in activities and muscle strength might be moderated by other biomechanical factors, like proprioception. Recent studies have established that proprioception is reduced in patients with EDS-HT still no studies are available at this time which have investigated the impact of proprioception on the association between muscle strength and activity limitations in patients with EDS-HT. Therefore, the objective of the study was to establish the association between muscle strength and activity limitations and the impact of proprioception of the knee joint on this association in patients with EDS-HT.
Methods: 25 subjects with EDS-HT were compared with 24 healthy controls. Activity limitations, both performance and capacity qualifiers, were quantified according to the Health Assessment Questionnaire (HAQ), the Six-Minute Walk test (6MWT) and the 30-second chair-rise test (30CRT). Muscle weakness was measured by handheld dynamometry (normalised over fat-free mass) and (knee) proprioception was measured by movement detection paradigm. Pain was measured-with an Visual Analogue Scale, fatigue by the Checklist Individual Strength and subject demographics (age, BMI, disease duration) were questioned. Statistical analyses were performed in three stages. First, descriptions of the subjects and the measures of central tendency were calculated. All outcomes were transformed into z-scores in order to aid in meaningful interpretability. Healthy controls were used within statistical analyses as a contrast group in terms of disease severity as to the divergence from normality. Secondly, differences between groups were determined by independent Student t-test. Thirdly, the association between dependent and independent variables were performed, in order to determine the inter-variable relationship and to identify potential confounding factors. All significant factors were retained for multivariate analyses. In the final stage, the association of muscle strength with activity limitations was established, controlled for the moderation by proprioception, pain and fatigue and other potential confounders (age, BMI, disease duration). For each outcome of activity limitations, a two level (subjects and controls) mixed linear model was constructed in which activity limitations was the dependent variable and muscle strength and proprioception independent variables. This association was adjusted for the potential confounders: age, BMI, disease duration. In the adjusted model all independent variables were entered and consecutively a backward selection was applied in order to establish the final model. The independent factors were retained by default, whereas confounders and interaction effects were retained in the final model when a p-value of $<.200$ was present and the deletion of a variable resulted in a reduction of the Tsai-Hutch Criterion (AICC: Goodness of Fit). Results of the mixed linear models were presented in regression coefficients and corresponding standard errors (B(SE)) with 95% confidence intervals (95%CI).
Results: Subjects with EDS-HT showed a higher degree of activity limitations, more pain and fatigue, muscle weakness and proprioceptive inaccuracy compared to the healthy controls ($p < 0.05$). Muscle weakness was correlated with lower scores on the 30CRT ($r = .669$, $p < .0001$), the 6MWT ($r = .577$, $p = <.0001$) and higher scores on the HAQ ($r = .626$, $p = <.0001$). Proprioceptive inaccuracy was associated with lower scores on the 30CRT ($r = .552$, $p < .0001$), the 6MWT ($r = .400$, $p = .001$) and higher scores on the HAQ ($r = .456$, $p = .001$). Muscle weakness was found to be the largest contributor to the variance in activity limitations. Proprioceptive inaccuracy, pain and fatigue had an impact on the association between muscle strength and activity limitations ($p < .05$).
Conclusion: Muscle weakness was associated with an increase in activity limitations in subjects with EDS-HT. This association was moderated by joint proprioception, and should be recognised as an important factor when developing new treatment modalities which aim to reduce activity limitations.

Education

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CONTENT AND EVALUATION OF THE BEEP TRIAL (BENEFITS OF EFFECTIVE EXERCISE FOR KNEE PAIN) PHYSICAL THERAPIST TRAINING PROGRAMME: DID IT CHANGE CLINICAL PRACTICE?

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Purpose: Clinical guidelines consistently recommend exercise as a core treatment for patients with knee osteoarthritis (OA). Physical therapists are well placed to deliver exercise programmes for this population, yet we have previously shown that their current practice is suboptimal. This study aimed to explore whether participating in a training programme and delivering an exercise intervention as part of the BEEP trial (Benefits of Effective Exercise for chronic knee Pain) (ISRCTN93634563) results in changes in physical therapists' clinical behaviour for patients with knee OA.
Methods: 53 physical therapists from 11 NHS clinics in the West Midlands (UK) were trained to deliver one of three exercise-based interventions within the BEEP trial: 'usual physical therapy care', 'individually tailored exercise', and 'targeted exercise adherence'. The training programme was stepped in that all physical therapists attended the first day and received an update of the evidence base for exercise and knee OA, based on the National Institute for Health and Care Excellence (NICE) OA guidelines. Days two and three, attended by physical therapists delivering 'individually tailored exercise' and 'targeted exercise adherence', focused on why and how to individualise, progress and supervise lower limb exercise. Days four and five were only attended by physical therapists delivering 'targeted exercise adherence' and focused on the importance of exercise adherence, the physical therapist's role in facilitating behaviour change, and sustaining long-term physical activity. The training programme included lectures, workshops, role play, group discussion and case studies, with homework set to consolidate learning. In order to evaluate the BEEP trial training programme all physical therapists were asked to complete a questionnaire before (pre-training), immediately afterwards (post-training), and after delivering the BEEP trial exercise intervention (post-intervention, approximately 12–18 months after the training). The questionnaire included a vignette describing a 'typical' patient with knee OA and associated clinical management questions, including their use of exercise for the vignette case.
Results: Nearly all physical therapists returned the pre-training questionnaire ($n = 52$), 44 (85%) and 39 (74%) returned the post-training and post-intervention questionnaires respectively. The majority were female (63%), and treated at least one patient with knee OA per week (62%). Pre-training, all physical therapists reported that they would provide advice and exercise for the vignette case, but often alongside other interventions, including manual therapy (29%), acupuncture (15%), and electrotherapy (12%). Exercise focused on local knee muscle strengthening (100%), and flexibility/ range of movement exercise (92%) as opposed to formal aerobic training (17%). During follow-up appointments, 78% of physical therapists reported that they would supervise exercise, and 60% would provide written advice on home exercises. Nearly all reported that they would monitor exercise adherence, but only 6% would use an exercise diary. Post-training, fewer